MEDICAL EDUCATION RESOURCE

Muscles of the Front of Forearm,Superficial Muscles,Deep Muscles

Muscles of the Front of Forearm

Overview

- The **anterior compartment of the forearm** contains **flexor and pronator muscles**.
- These muscles are arranged in **three layers**:
    1. **Superficial group**
    2. **Intermediate group** (Flexor digitorum superficialis)
    3. **Deep group**
- **Common origin:** *Medial epicondyle of humerus* via the **common flexor tendon**.
- **Nerve supply:** Mostly **median nerve** (C6–C8), except **flexor carpi ulnaris** and medial half of **flexor digitorum profundus** (ulnar nerve).
- **Main actions:** Flexion of wrist and digits, pronation of forearm.

I. Superficial Muscles

? **Mnemonic:** “Pass–Fail–Pass–Fail” (from lateral to medial)
P – Pronator teres
F – Flexor carpi radialis

P – Palmaris longus
F – Flexor carpi ulnaris

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1. Pronator Teres

Origin

- *Humeral head:* Medial supracondylar ridge and common flexor origin.
- *Ulnar head:* Medial side of coronoid process of ulna.

Insertion

- Middle of lateral surface of radius.

Nerve Supply

- Median nerve (C6–C7).

Action

- Pronates forearm and assists in elbow flexion.

Clinical Note

- Median nerve passes between its two heads ? compression here causes **pronator syndrome**.

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2. Flexor Carpi Radialis

Origin

- Common flexor origin from medial epicondyle of humerus.

Insertion

- Bases of 2nd and 3rd metacarpal bones.

Nerve Supply

- Median nerve (C6–C7).

Action

- Flexes and abducts wrist (radial deviation).

Clinical Note

- Used as a **guide to locate radial artery pulse** (artery lies lateral to its tendon).

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3. Palmaris Longus

Origin

- Common flexor origin (medial epicondyle).

Insertion

- Flexor retinaculum and palmar aponeurosis.

Nerve Supply

- Median nerve (C7–C8).

Action

- Tenses palmar fascia and flexes wrist.

Clinical Note

- Absent in about **10–15% of individuals**; used for tendon grafts.

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4. Flexor Carpi Ulnaris

Origin

- *Humeral head:* Medial epicondyle of humerus.
- *Ulnar head:* Olecranon and posterior border of ulna.

Insertion

- Pisiform, hook of hamate, and base of 5th metacarpal.

Nerve Supply

- Ulnar nerve (C7–C8).

Action

- Flexes and adducts wrist (ulnar deviation).

Clinical Note

- Only **superficial forearm flexor supplied by ulnar nerve**.
- Forms the **roof of ulnar nerve groove** at wrist.

II. Intermediate Muscle

Flexor Digitorum Superficialis

Origin

- *Humeroulnar head:* Medial epicondyle, ulnar collateral ligament, coronoid process.
- *Radial head:* Oblique line of radius.

Insertion

- By four tendons into the **middle phalanges** of medial four fingers (each splits into two slips at PIP joint).

Nerve Supply

- Median nerve (C7–T1).

Action

- Flexes **proximal interphalangeal joints** (PIP), also assists in wrist and MCP flexion.

Clinical Note

- Important test: isolate PIP joint movement while immobilizing others ? tests FDS integrity.

III. Deep Muscles

? **Mnemonic:** “F–F–P”

- **F**lexor digitorum profundus
- **F**lexor pollicis longus
- **P**ronator quadratus

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1. Flexor Digitorum Profundus (FDP)

Origin

- Anterior and medial surfaces of ulna and interosseous membrane.

Insertion

- Bases of distal phalanges of medial four fingers.

Nerve Supply

- Medial half ? Ulnar nerve (C8–T1).
- Lateral half ? Anterior interosseous branch of median nerve (C8–T1).

Action

- Flexes **distal interphalangeal joints (DIP)**, assists in flexion of PIP and wrist joints.

Clinical Note

- Test: flex DIP joint while keeping PIP fixed ? tests FDP.

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2. Flexor Pollicis Longus

Origin

- Anterior surface of radius and adjacent interosseous membrane.

Insertion

- Base of distal phalanx of thumb.

Nerve Supply

- Anterior interosseous nerve (C8–T1).

Action

- Flexes IP joint of thumb and assists in wrist flexion.

Clinical Note

- Involved in **tenosynovitis** of thumb (pain during thumb flexion).

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3. Pronator Quadratus

Origin

- Distal fourth of anterior surface of ulna.

Insertion

- Distal fourth of anterior surface of radius.

Nerve Supply

- Anterior interosseous nerve (branch of median nerve).

Action

- **Chief pronator** of forearm (acts with pronator teres).
- Helps stabilize distal radioulnar joint.

Clinical Note

- Last muscle to be paralyzed in median nerve injury at forearm level.

Dissection of the Front of Forearm

Steps

1. Make a **midline incision** from elbow to wrist.
2. Reflect the skin and superficial fascia to expose:
    - *Median cubital vein* (in cubital fossa).
    - *Medial & lateral cutaneous nerves of forearm.*
3. Remove deep fascia ? identify **superficial muscles (Pass–Fail–Pass–Fail)**.
4. Reflect these muscles to expose:
    - **Flexor digitorum superficialis** ? intermediate layer.
    - Beneath it, note the **deep muscles (FDP, FPL, Pronator quadratus)**.
5. Identify **median nerve** between FDS and FDP; **ulnar nerve** between FCU and FDP.
6. Observe **radial and ulnar arteries** with their companion veins.